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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,935	02/10/2004	Takeshi Nogami	09792909-5802	3159

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EXAMINER

VAN, LUAN V

ART UNIT	PAPER NUMBER
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1753

MAIL DATE	DELIVERY MODE
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08/21/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/775,935	NOGAMI ET AL.	
	Examiner	Art Unit	
	Luan V. Van	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-7 and 9-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-7 and 9-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Response to Amendment

Applicant's amendment of July 23, 2007 does not render the application allowable.

Status of Objections and Rejections

All rejections from the previous office action are withdrawn in view of Applicant's amendment.

New grounds of rejection under 35 U.S.C. 103(a) are necessitated by the amendments.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ting et al. in view of Cheung et al. (US patent 6136163) and Poag et al. (US patent 6197123).

Regarding claims 2 and 4, Ting et al. teach a semiconductor manufacturing apparatus comprising: an electrolytic plating chamber 10 (Figs. 1-2) with which an electrolytic plating apparatus responsible for electrolytic plating of a substrate is constructed; an electrolytic polishing chamber 10 (the additional electrolytic plating chamber can be used as a polishing chamber, Figs. 1-2, column 4, lines 18-31) with which an electrolytic polishing apparatus responsible for electrolytic polishing of the substrate is constructed; and a conveying chamber 51 (Fig. 12) having installed therein a conveying instrument responsible for loading/unloading (column 17, lines 9-13) of the substrate to or from said electrolytic plating chamber and to or from said electrolytic polishing chamber, and being connected respectively to said electrolytic plating chamber and said electrolytic polishing chamber, wherein the electrolytic plating and/or polishing chamber with which the electrolytic plating and/or polishing apparatus is constructed comprises: a holder 13 (Figs. 2-3) for holding the substrate; and a cup 12 (Figs. 2, 4-9) provided so as to oppose to said holder and is capable of forming a closed space, into which an electrolytic plating solution can be filled, together with the substrate held by said holder. In addition, Ting et al. teach a plurality of manifolds 18-20, i.e. nozzles, for supplying DI water to clean remaining fluid on or around the wafer support and for supplying nitrogen gas to provide the drying of the interior of the chamber

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(column 11 lines 15-30). The manifolds are also provided outside of cup 12. Ting et al. also teach drain 23, i.e. outlet portion, (Figs. 1-2) provided through the peripheral wall of the chamber.

Ting et al. differ from the instant claims in that the reference does not explicitly disclose a nozzle affixed on the peripheral sidewall of the chamber or an inlet portion provided through a peripheral wall.

Cheung et al. teach an electroplating apparatus comprising a spin-rinse-dry module having nozzles placed above the substrate and outside of the diameter of the substrate to lessen the risk of the nozzles dripping on the substrate (column 5 line 66 -- column 6 line 1). According to the Merriam-Webster online dictionary (<http://www.m-w.com>), the word affix is defined as "to attach physically" or "to attach in any way". Therefore, the nozzle 340 of Cheung et al. as seen in Fig. 5 is broadly interpreted to be affixed to the chamber wall 330 by articulating member 343.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Ting et al. by affixing the nozzle on a peripheral sidewall of the chamber as taught by Cheung et al., because the nozzle would be positioned away from the substrate and therefore lessen the risk of the nozzles dripping on the substrate (column 5 line 66 -- column 6 line 1 of Cheung et al.).

Poag et al. teach an apparatus for processing substrates such a semiconductor wafers comprising a chamber 12 (Fig. 1) having a production nozzle and two cleaning nozzles (36, 41). In addition, Poag et al. teach an inlet portion 33 provided through the peripheral wall 11 of the chamber 12 for supplying a gas into the chamber.

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It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the apparatus of Ting et al. by providing the inlet portion of Poag et al. through the peripheral wall of the chamber, because it would simplify the construction of the apparatus by obviating the tubing within the chamber to supply a process fluid.

Regarding claim 3, the apparatus of Ting et al. is structurally capable of supplying a cleaning liquid.

Regarding claim 5, Ting et al. teach manifolds 18-20 (Fig. 5), which are structurally capable of supplying a cleaning liquid or etching solution onto the surface of the substrate. The manifolds are also provided outside of cup 12.

Claims 6, 7 and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ting et al. in view of Cheung et al., Maydan et al., and Poag et al.

Regarding claim 6, Ting et al. teach a semiconductor manufacturing apparatus comprising: an electrolytic plating chamber 49 (Fig. 12) with which an electrolytic plating apparatus responsible for electrolytic plating of a substrate is constructed; an electrolytic polishing chamber 49 with which an electrolytic polishing apparatus responsible for electrolytic polishing of the substrate is constructed; an electroless plating chamber 49 (the plating chamber of Ting et al. is structurally capable of being used as an electroless plating chamber in the absence of an applied current) with which an electroless plating apparatus responsible for electroless plating of the substrate is constructed; and a conveying chamber 51 having installed therein a conveying instrument responsible for

loading/unloading of the substrate to or from said electrolytic plating chamber, to or from said electrolytic polishing chamber, to or from said electroless plating chamber, and being connected respectively to said electrolytic plating chamber, said electrolytic polishing chamber, and said electroless plating chamber, and said conveying chamber being connected with a liquid treatment chamber for supplying a process liquid, wherein said liquid treatment chamber comprises a holder for holding the substrate, and a nozzle for supplying the process liquid onto a surface of the substrate held by said holder. The additional plating chamber would read on the liquid treatment chamber of the instant claim.

Ting et al. differ from the instant claims in that the reference does not explicitly teach an annealing chamber. Ting et al. differ from the instant claims in that the reference does not explicitly disclose a nozzle affixed on the peripheral sidewall of the chamber or an inlet portion provided through a peripheral wall.

Cheung et al. teach an electroplating apparatus comprising a spin-rinse-dry module having nozzles placed above the substrate and outside of the diameter of the substrate to lessen the risk of the nozzles dripping on the substrate (column 5 line 66 -- column 6 line 1). According to the Merriam-Webster online dictionary (<http://www.m-w.com>), the word affix is defined as "to attach physically" or "to attach in any way". Therefore, the nozzle 340 of Cheung et al. as seen in Fig. 5 is broadly interpreted to be affixed to the chamber wall 330 by articulating member 343. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Ting et al. by affixing the nozzle on a peripheral sidewall of

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the chamber as taught by Cheung et al., because the nozzle would be positioned away from the substrate and therefore lessen the risk of the nozzles dripping on the substrate (column 5 line 66 -- column 6 line 1 of Cheung et al.).

Poag et al. teach an apparatus for processing substrates such a semiconductor wafers comprising a chamber 12 (Fig. 1) having a production nozzle and two cleaning nozzles (36, 41). In addition, Poag et al. teach an inlet portion 33 provided through the peripheral wall 11 of the chamber 12 for supplying a gas into the chamber. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Ting et al. by providing the inlet portion of Poag et al. through the peripheral wall of the chamber, because it would obviate extending the tubing within the chamber, thus simplifying the construction of the apparatus. It would have been obvious to one having ordinary skill in the art to have a separate inlet portion for gas and for liquid, because it would prevent the process liquid from contacting the substrate when a gas is introduced into the chamber.

Maydan et al. teach an apparatus comprising an annealing chamber 211 (Fig. 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Ting et al. by using the annealing chamber of Maydan et al., because an annealing chamber is typically utilized in substrate processing systems to enhance the properties of the deposited materials by recrystallization of the deposited films, such as copper films, which can cause the flow of the deposited material to fill voids formed in features, purify layers of contaminants, such as oxygen, encourage diffusion of dopants, such as phosphorus, in the deposited

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materials, and manage crystal growth and orientation to control film properties (column 7, lines 49-61 of Maydan et al.)

Regarding claim 7, Ting et al. teach said conveying instrument is responsible for loading/unloading of the substrate to or from said electrolytic plating chamber, to or from said electrolytic polishing chamber, to or from said electroless plating chamber, and is also responsible for loading/unloading of the substrate to or from said liquid treatment chamber (column 17, lines 3-34).

Regarding claims 9 and 13, Ting et al. teach manifolds 18-20 (Fig. 5), which are structurally capable of supplying a cleaning liquid or etching solution onto the surface of the substrate. The manifolds are also provided outside of cup 12.

Regarding claims 10 and 12, Ting et al. teach the electrolytic plating or polishing chamber with which the electrolytic plating or polishing apparatus is constructed comprises: a holder 13 (Figs. 2-3) for holding the substrate; a cup 12 (Figs. 2, 4-9) provided so as to oppose to said holder and is capable of forming a closed space, into which an electrolytic plating solution can be filled, together with the substrate held by said holder; and a nozzle 18 (Figs. 5-6) for supplying a process liquid onto a surface of the substrate held by said holder.

Regarding claim 11, the apparatus of Ting et al. is structurally capable of operating with a cleaning liquid.

Response to Arguments

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Applicants' arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

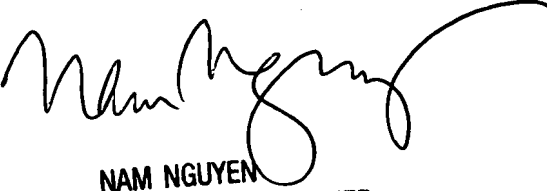
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan V. Van whose telephone number is 571-272-8521. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LVV
August 4, 2007



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